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EXAMINER
ONUAKU, CHRISTOPHER O

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DATE MAILED: 05/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _17 February 2004_.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-38_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-38_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1.   A request for continued examination under 37 CFR 1.114, including the fee set

forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this

application is eligible for continued examination under 37 CFR 1.114, and the fee set

forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action

has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/17/04

has been entered.

Response to Arguments

2.   Applicant's arguments filed 2/17/04 have been fully considered but they are not

persuasive.

Applicant argues that Toebes fails to disclose the limitation ""... said cache

configured to store an arbitrary number of previousl decoded frames"

In response, examiner refers the applicant to col.4, lines 21-45; col.5, lines 50-

67; col.9, line 49 to col.10, line 3; col.10, lines 48-58; col.12, lines 42-64 and col.14,

lines 12-44, wherein Toebes discloses that as the stream is parsed and decoded, the

MPEG player constantly keeps the last two reference frames available for use in

decoding B and P frames when they appear. The first reference frame decoded is

placed in the future buffer (cache). When a new reference frame is encountered in the

decoder's parsing of the bitstream (bitstream order), the previous "future" frame

becomes the "past" frame and is normally displayed at that time. The new reference

frame is read into the future buffer and becomes the future buffer. These available

reference frames are known as the "past" and "future" frames or pictures and are

normally kept in portions of the computer or decoder memory known respectively as the

"past" and "future" buffers.

It is, therefore, clear that the "past" and "future" buffers of Toebes refer to

decoded frame buffers (caches), wherein the required frames are decoded and stored

in the decoded frame buffers during the reproducing process in order to facilitate the

decoding of the B or C frames.

Claim Rejections - 35 U.S.C. § 102

3.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the
> United States before the invention thereof by the applicant for patent, or on an international application
> by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title
> before the invention thereof by the applicant for patent.

4.   Claims 1-8,10-13,15-21&23-38 are rejected under 35 U.S.C. 102(e) as being anticipated

by Toebes, VIII et al (US 5,959,690).

Regarding claim 1, Toebes, VIII et al disclose a system and techniques for

altering and decompressing digital motion video signals in a manner which allows

efficient reverse play of the motion video as well as efficient frame-level access and play

of the motion video stream for creation of other special video effects, comprising the

method of:

a) determining a request to randomly access (see col.7, lines 34-48 and col.15,

lines 24-50) a particular frame,

b) maintaining a list of frame dependencies identifying at least a set of frames

required to decode the particular frame (see col.14, lines 29-45),

c) determining based at least in part on the list of frame dependencies whether a

decoded version of the particular frame is in a decoded frame cache (buffer), the cache

configured to store an arbitrary number of previously decoded frames, and if it is not

and if the particular frame has a frame dependency: I) determining a frame dependency

for the particular frame, ii) determining which of the frames in the frame dependency are

in the decoded frame cache, iii) decoding any frame in the frame dependency that is not

in the decoded frame cache and placing it in the decoded frame cache, and iv) using at

least some of the decoded frames in the frame dependency to decode the particular

frame to create a decoded version of the particular frame (see Fig.3,4a,4b&8; col.14,

lines 29-45; col.15, line 24 to col.16, line 37; col.4, lines 21-45; col.5, lines 50-67; col.9,

line 49 to col.10, line 3; col.10, lines 48-58; col.12, lines 42-64).

Regarding claim 2, Toebes discloses the method of wherein the request to

playback a particular frame is part of a request to perform frame-by-frame backward

playback and part (c) is performed for successively earlier frames with respect to the

particular frame as part of the frame-by-frame backward playback (see Fig.9, col.17,

line 35 to col.18, line 19).

Regarding claim 3, Toebes discloses the method wherein part (I) is performed

whether or not it is determined that a decoded version of a particular frame is in the

decoded frame cache without part (iv) being performed (see col.12, line 42-63).

Regarding claim 4, Toebes discloses the method wherein the particular frame

may be an I, P, or B frame of the MPEG compressed video (col.12, line 42-63).

Regarding claim 5, Toebes discloses the method wherein the frame dependency

is an immediate frame dependency (see col.12, lines 27-63).

Regarding claim 6, Toebes discloses the method wherein the at least some of

the decoded frames referred to in part (iv) are those frames in the immediate

dependency (see col.12, lines 27-63 and col.15, lines 24-50).

Regarding claim 7, Toebes discloses the method wherein part (c) includes

recursion where frames in the immediate frame dependency of the frame of interest are

not in the decoded frame cache (see col.8, line 24 to col.16, line 27; also see col.12,

lines 51-63 and col.10, line 59 to col.11, line 9), here the recursion where frames in the

immediate frame dependency of the frame of interest are not in the decoded frame

cache is not explicitly stated in the algorithm of Fig.8, but it is inherent in the process of

trying to determine if all of the frames from which a target frame depends are parsed

and added to the appropriate buffer in order to successfully complete the decoding

process of the target frame, as disclosed in col.12, lines 51-63 and col.10, line 59 to

col.11, line 9.

Regarding claim 8, Toebes discloses the method wherein part (c) includes a loop

with a terminating condition that all frames on which the particular from is dependent

have been decoded (see Fig.8, and col.15, line 24 to col.16, 27).

Regarding claim 10, Toebes discloses the method wherein an index is used to

represent each frame in the frame dependency (see Fig.3, and col.9, line 65 to col.10,

line 39).

Regarding claim 11, Toebes discloses the method wherein the frame

dependency is determined through a look-up table (see Fig.4b, and col.10, line 62 to

col.11, line 9), examiner reads Fig.4a as frame dependency look-up table since Fig.4b

shows the frames from which the frame dependency of a frame can be determined..

Regarding claim 12, Toebes discloses the method wherein the frame

dependency is determined through successive uses of a look-up table (see Fig.4b, and

col.10, line 62 to col.11, line 9), as shown in claim 11, the look-up table of Fig.4b is used in the determination of the frame dependency of I- or P- or B-frame.

Regarding claim 13, Toebes discloses the method wherein the decoded frame cache includes a data structure (see 'past' and 'future' buffers as the decoded frame cache (buffer); col.4, lines 21-45; col.10, lines 48-58; col.11, lines 4-9, col.12, lines 35-63; and col.15, line 66 to col.16, line 7).

Regarding claim 15, the claimed limitations of claim 15 are accommodated in the discussions of claim 1, except a computer readable medium (see col.8, lines 35-48).

Regarding claim 16, the claimed limitations of claim 16 are accommodated in the discussions of claim 2.

Regarding claim 17, the claimed limitations of claim 17 are accommodated in the discussions of claim 3.

Regarding claim 18, the claimed limitations of claim 18 are accommodated in the discussions of claim 5.

Regarding claim 19, the claimed limitations of claim 19 are accommodated in the discussions of claim 6.

Regarding claim 20, the claimed limitations of claim 20 are accommodated in the discussions of claim 7.

Regarding claim 21, the claimed limitations of claim 21 are accommodated in the discussions of claim 8.

Regarding claim 23, the claimed limitations of claim 23 are accommodated in the discussions of claim 10.

Regarding claim 24, the claimed limitations of claim 24 are accommodated in the discussions of claim 11.

Regarding claim 25, the claimed limitations of claim 25 are accommodated in the discussions of claim 12.

Regarding claim 26, the claimed limitations of claim 26 are accommodated in the discussions of claim 15, including processor (see Fig.2 and at least de-multiplexer 15, MPEG streamer 23 and MPEG player 37), a display (see display 35), and memory including instructions (see Fig.2 and MPEG player 37 and col.11, lines 20-38 and col.15, lines 24-50).

Regarding claim 27, Toebes, VIII et al disclose a system and techniques for altering and decompressing digital motion video signals in a manner which allows efficient reverse play of the motion video as well as efficient frame-level access and play of the motion video stream for creation of other special video effects, comprising the method of: maintaining a list of frame dependencies identifying at least a set of frames required to decode the first frame (see col.14, lines 29-45), determining a decoding of the first frame is not in a decoded frame cache, determining, based at least in part on the list of frame dependencies, a first frame dependency for the first frame comprising frames required to decode the first frame, decoding at least one of the frames of the frame dependency not present in the decoded frame cache, and placing it in the decoded frame cache, and decoding the first frame using at least one of the decoded frames in the decoded frame cache (see Fig.4a&4b; col.13, line 38 to col.14, line 2; and col.6, lines 21-67, and col.10, line 59 to col.11, line 38), here the B frame reads on the claimed "first frame", and "past" and "future" buffers read on the claimed decoded frame cache, ..

Regarding claim 28, Toebes, VIII et al disclose the method comprising decoding each frame of the frame dependency not present in the decoded frame cache and placing them in the decoded frame cache (see col.13, 47-51; also see claim 27 discussions).

Regarding claim 29, the claimed limitations of claim 28 are accommodated in the discussions of claim 7 above.

Regarding claim 30, Toebes, VIII et al disclose the method of reverse playback comprising determining a second frame is not in the decoded frame cache, the second frame following the first frame in the video stream, determining a second frame dependency for the second frame comprising frames required to decode the second frame, decoding at least one of the frames of the frame dependency not present in the decoded frame cache, and placing them in the decoded frame cache, and decoding the second frame using at least one of the decoded frames in the decoded frame cache (see col.17, line 35 to col.18, line 25), here the P frame reads on the claimed "second frame".

Regarding claim 31, Toebes, VIII et al disclose the method comprising playing the second frame and then the first frame (see claim 27 and claim 30 discussions wherein Toebes, VIII et al disclose the methods of playing a first frame in normal play and playing the second frame in reverse playing, and therefore, the claimed limitations of claim 31 are accommodated in the discussions of claims 27 and claim 30 above).

Regarding claim 32, the claimed limitations of claim 32 are accommodated in the discussions of claims 27 and claim 30 above, since B frame of claim 27 immediately follow the P frame of claim 30.

Regarding claim 33, the claimed limitations of claim 33 are accommodated in the

discussions of claim 15 and claim 27 above, including wherein the cache is configured

to store an arbitrary number of previously decoded frames (see (see Fig.3,4a,4b&8;

col.14, lines 29-45; col.15, line 24 to col.16, line 37; col.4, lines 21-45; col.5, lines 50-67;

col.9, line 49 to col.10, line 3; col.10, lines 48-58; col.12, lines 42-64).

Regarding claim 34, the claimed limitations of claim 34 are accommodated in the

discussions of claims 28&33 above.

Regarding claim 35, the claimed limitations of claim 35 are accommodated in the

discussions of claims 7,27& 33 above.

Regarding claim 36, the claimed limitations of claim 36 are accommodated in the

discussions of claims 30&33 above.

Regarding claim 37, the claimed limitations of claim 37 are accommodated in the

discussions of claim 1 above.

Regarding claim 38, the claimed limitations of claim 38 are accommodated in the

discussions of claims 1&2 above.

Claim Rejections - 35 U.S.C. § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6.   Claims 9&22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toebes,

VIII et al in view of Proctor et al (US 6,072,830).

Regarding claim 9, Toebes, VIII et al fail to disclose wherein decoded frames are

replaced in the decoded frame cache according to a least recently used policy. Proctor

et al teach method and apparatus of encoding and decoding digitized video signals

comprising Fig.4 and cache update mechanism 42 and cache memory 36, wherein one

of the following cache stack replacement algorithms is utilized: the least-recently-used

(LRU) algorithm, the least-frequently-used (LFU) algorithm, the first-in-first-out (FIFO)

algorithm. In the least-recently-used algorithm, the motion vector to be replaced is the

one whose last reference is the oldest, or has the largest backward distance (see

col.11, line 51 to col.12, line 11).

It would have been obvious to modify Toebes by realizing Toebes with the

means to apply the least-recently-used algorithm, as taught by Proctor, in the

manipulation of the contents of a cache, e.g., the future buffer, wherein decoded frames

are stored for processing, in order, for example, to replace the decoded frame whose

last reference is the oldest, thereby creating more space in the future buffer to store more recently decoded frames for future processing.

Regarding claim 22, the claimed limitations of claim 22 are accommodated in the discussions of claim 9.

7.   Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Toebes, VIII et al.

Regarding claim 14, Toebes fails to explicitly disclose the method wherein the decoded frame cache includes a section of main memory. Official Notice is taken that it is well known to include in one memory means different sections that store different types of data, each data section serving a specific function. It would, therefore, have been obvious to modify Toebes by realizing Toebes with a memory system (main memory) containing different sections and each section storing different type of data (e.g., decoded frame), thereby providing the desirable advantage of making the Toebes memory system a more compact system.

Conclusion

8.   Any inquiry concerning this communication or earlier communications from this examiner should be directed to Christopher Onuaku whose telephone number is (703) 308-7555. The examiner can normally be reached on Tuesday to Thursday from 7:30 am to 5:00 pm. The examiner can also be reached on alternate Monday.

If attempts to reach the examiner by telephone is unsuccessful, the examiner's

supervisor, Andrew Christensen, can be reached on (703) 308-9644.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 872-9314, (for formal communications intended for entry)
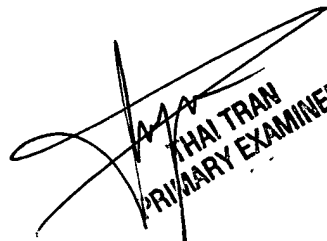
and (for informal or draft communications, please label "PROPOSED" or

"DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive,

Arlington. VA., Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application should

be directed to Customer Service whose telephone number is (703) 306-0377.

COO

4/28/04